

OBSERVED ASSOCIATIONS BETWEEN THE SOLAR CORONA AND SOLAR INTERIOR

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Observational associations between the interior of the Sun and solar corona are essential for understanding and identifying the physical processes by which magnetic fields generated in the solar interior make their way through the solar atmosphere, shaping the solar wind flow and determining solar activity. Establishing such connections in the past have been difficult because of the paucity and diversity of measurements of the corona and solar interior.

We have recently demonstrated a direct association between the corona and the zonal flow of the Sun. The latitudinal pattern of the correlation of coronal density separated in latitude by 20 degrees was found to be similar to that of the alternating slow and fast zonal bands observed in the outer part of the solar convection zone. The latter are also observed on the surface of the Sun where they are known as torsional oscillations. We have used the High Altitude Observatory Mauna Loa K-coronameter to further study the coronal density correlation. We will summarize these results and their implications for the solar cycle dependence of solar surface and subsurface flow.